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ON

THE DIATOMS OF THE BALTIC SEA

BY

H. JUHLIN-DANNFELT.

WITH 4 PLATES.

COMMUNICATED 1882, FEBRUARY 8.

STOCKHOLM, 1882.
KONGL. BOKTRYCKERIET,
P. A. NORSTEDT & SÖNER.

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For some years I have been occupied with an examination of the Diatoms which are found imbedded in the quarternary layers of Sweden, for the purpose of determining the circumstances under which these layers have been deposited. During this research I found that a great part of the younger deposits of eastern Sweden, viz: black-clay (svartlera), postglacialclay (åkerlera), alluvialclay and sand, silt (gyttja), siltyclay (gyttjeler), peat and shellbeds contained valves of marine Diatoms, and this, in connection with the proximity to the Baltic of the region where these layers were taken, indicated this sea as the place where they were formed.

It was of course of considerable interest to know, whether the diatoms, imbedded in these layers, were the same species as those that still form the diatomaceous flora of the Baltic, or if some alteration of species had taken place, and in that case, if the change showed a decrease of the saltness of the water.

But in the literature on Diatoms, which was known to me, the notices about the Baltic species were very scarce, and the number of the forms, enumerated as occurring in the Baltic Sea, rather small. J. SCHUMANN [1]), in his first paper on Prussian Diatoms, mentions only 23 species as living in the Baltic, CLEVE in »Svenska och Norska Diatomacéer», has 24 Baltic species, and a list of the species occurring in the harbour of Travemünde [2]) contains 37 forms. So SCHUMANN [3]), in his second paper, says that the Baltic is very poor in diatoms, a fact that is caused by the low saltness of its water. But on the contrary it seems as a sea which, like the Baltic, opens into the ocean, and into which, on the other hand, a great number of rivers pour their fresh water, might harbour a much greater number of species, — partly marine, partly freshwater- and brackish forms. Moreover from the Baltic once having been in open connection with the Arctic Ocean, one might expect to find some arctic forms still existing there.

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[1]) SCHUM. 1862.
[2]) Ostsee Exp. 1871.
[3]) SCHUM. 1864.

This supposition, — perhaps save the suspicion of still remaining arctic forms, — proved to be correct, when SCHUMANN, in his last paper [1]) gave a list of not less than 149 species and 9 varieties living in the Baltic. This number ought to be reduced a good deal, for he has readopted a great many of Kützingian species, which have proved to be very little distinct forms, and considering also that SCHUMANN, in his last mentioned paper, has a considerable number of new species, known to no other author, the diatomaceous flora of the Baltic seemed still well worth of a new examination.

In order to contribute in some degree to fill up this gap in our knowledge of the lower algae of the Scandinavian waters, I have made a number of collections of diatoms along the coast of the Baltic from Gefle to Malmö, from Hangö to Helsingfors and on the coasts of Gotland and Öland during the years 1879—1881, — in 1880 with a subvention from the Royal Academy of Science in Stockholm.

Besides my own gatherings from these travels, I have examined some collections that Prof. P. T. CLEVE of Upsala has had the kindness to place at my disposal, viz: some slides from the Baltic coast of Germany, a little collection from the south coast of Finland made by D:r ELFVING of Helsingfors, and some samples from the Gulf of Bothnia and from the coast of Gotland, taken by Prof. CLEVE himself. Through the kindness of Prof. S. LOVÉN of Stockholm I have also had the opportunity of examining some bottomsoil specimens from the south part of the Baltic.

In order to get the following list of Baltic species as complete as possible, I have added such species which are indicated by other authors as occurring in the sea here in question. Finally, I have also thought proper to add even such forms as I have found imbedded in bottomclay from the Baltic or in younger earths, evidently formed in the brackish water of that sea, though I might neither have found them myself nor seen them mentioned by others as living in the Baltic.

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[1]) SCHUM. 1868.

The bottomsoil specimens have been taken up with an apparatus invented by Mr TH. ARWIDSSON, chief of the Royal Hydrographic Department of Sweden and by the inventor kindly placed at my disposal. This »Bottom-Specimen-Catcher» has never been described, but according to my experience of it, I think it is well worth of being more commonly known and used, on account of the easiness with which it can be handled, — it is easily managed by one man, — and of the very good result with which it works where the bottom does not consist of rock, stones, gravel or hard sand. With the permission of the inventor I therefore take the liberty of giving a description and a drawing of it, the latter made by the care of the inventor.

The bottom-specimen-catcher, Plate IV, figs. I—III, consists of two scoops of iron plate, diameter about 20 cm., shutting closely to one another and united by a joint. On the top of each scoop there is a valve of leather, C, to let the air out, when the instrument is going down in the water. From the joint a chain of flat links, D, issues, and on one of these links, about 35 cm. above the scoops, there is a little hook, E, on which a string, that connects the two eyes, F, on the outer sides of the scoops is to be hooked. The string is so short that, when it is hooked on, the scoops are held wide open. At the middle of the string a corkfloat is fastened, big enough to hold it in perpendicular position in the water, when it is not hooked on, and on the corkfloat the eye of brass wire, G, is fastened by which the string is hung on the hook. The instrument is lowered by a rope, fastened to the end of the chain. and in lowering has the appearanc represented in fig. I. When it reaches the bottom, it sinks down into the clay or mud, and when it stops sinking, the chain with the hook, by its own gravity, continues sinking, but as the string is held upright by the corkfloat, the eye slips off from the hook. When the instrument then is hauled up, there is nothing that holds the scoops apart, and so they clap together around the mud or clay that fills up their interior. In order to increase the weight of the instrument, the innermost part of the scoops, — down to the punctated line —, is filled with lead, B.

For the determination of the more difficult species I needed a microscope of high magnifying power, and through the kindness of Profs. **Th. Fries** of Upsala and S. O. **Lindberg** of Helsingfors, I have had the opportunity of using the excellent microscopes belonging to the institutions under their superintendence, and I take here an opportunity of bringing them my best thanks. Last but not least I am indebted to our renowned diatomist, Prof. P. T. **Cleve**, for the untiring benevolence with which he has adviced and assisted me, and for which I can never thank him enough.

Concerning the mode of growth of the diatoms, it seems probable that generally they do not live at a greater depth. In enormous masses they occur fixed to stones, seaweed, and smaller algae, and to the very bottom in the waterline and at a depth of a few inches. Towards the deeper water they increase very suddenly in number, so that at a depth of only a few fathoms the bottomsoil specimens very seldom contained any living frustules, and in the mud from greater depths the valves found imbedded are always very scarce. So for instance on the coast near Helsingfors in a great many samples taken up from the bottom, I always found masses of diatoms in the shallow bays, — 1—2 feet deep, — but almost no valves or whole frustules, and not any living diatoms at all, at a depth of 2 fathoms or more. The few species that I have found imbedded in the bottomclay or mud from the deep water, generally are such as live free, — not fixed —, swimming in the upper layers of the water, and these I think in sunshine and fine weather live floating at the very surface of the water, else some feet underneath, but do not sink down to the bottom till after death. The species which commonly occur in bottom specimens are: Navicula didyma K, N. Smithii **Bréb.**, N. interrupta K., Pleurosigma elongatum **Sm.**, Coscinodiscus polyacanthos v. balticus **Grun.**, fragments of Coscin. Oculus Iridis **Ehb.** or radiatus **Ehb.** On the contrary, one generally misses those species, which in such enormous masses cover the bottom and the seaweed at the shore, such as Melosira Jürgensii K., M. nummuloides **Dillw.**, Epithemiæ, Amphoræ, Cocconeis Scutellum E. and Placentula E., Gomphonema balticum **Cl.**, Achnanthes longipes **Lgb.**, Rhoicosphenia curvata GRUN., Synedra pulchella and affinis K. SCHWARZ[1]) also observes that all bottom specimens, examined by him, were almost destitute of diatoms, and J. H. L. FLÖGEL[2]) says that the bottom specimens contained almost no valves, and those that were found imbedded in them, did not belong to the species abundantly occurring on the shores. A similar observation is also made by GREGORY[3]) who supposes that the species which are mentioned as occurring at great depths in the Atlantic and the Pacific Ocean, have not lived near the bottom but have sunk down after death. In CL. & MÖLL. Diat. N:o 45 on the contrary it is said that Epithemia turgida EHB. and Rhabdonema minutum were found in the Baltic on Conferva Aegagropila at a depth of 150 fathoms, — yet it is not expressly, said, that they did live at that depth. Also FLÖGEL[4]) says that Paralia marina SM. seems to live in the deepest regions.

The diatoms, living free in the open sea near the surface, seem to occur comparatively sparingly, as could also be supposed from their scarceness in the bottom mud. Richest in diatoms I always found shallow bays, — 1—2 feet deep, — open to the sunshine but protected from winds and waves. Bays which answer these conditions, and which are quite or nearly cut off from open connection with the sea, and thus have a water, quite fresh to the taste[5]), — often have a very rich vegetation of Diatoms, which there, together with smaller green algae and rests of lower, microscopical animals, form a layer, often several feet deep, which, on the surface, consists of still living algae and animals. According to the relative quantities of the diatoms and the green algae that compose such a layer, the putrifaction goes faster or slower. If the main part consists of diatoms, these give the mass a brown colour to the depth of $^1/_2$—1 feet, if on the contrary green algae occur in it in greater quantity, only the surface is green, and already at the depth of one inch, the mass gets quite black and smells of hydrosulphuric acid. An interesting fact is that the diatomaceous flora of such bays contains quite the same species as occur imbedded in the silt from the bottom of the peatmosses and in the silty clay from eastern Upland which I have examined, and it is very different in its species from that one of the open coast. Here the main mass is constituted by freely floating forms. Especially characteristic for these localities are: Campylodiscus Echineis K., and Clypeus K., Navicula peregrina K., oblonga K. and sculpta **Ehb.**, Nitzschia circumsuta **Bail** and scalaris **Sm.**, Chaetoceros Wighami **Btw.** (— only sporangial forms found —) and Melosira Westii **Sm.** Besides Epithemiæ and Amphora cymbiforme occur there very commonly, especially if Characeæ also grow there, in which case they are fixed on these. On the contrary, some species which otherwise occur very commonly on the shores of the Baltic, are here very scarce or quite missing, such as Rhoicosphenia curvata **Grun.**, Achnanthes longipes **Lgb.**, brevipes **Ag.** and subflexilis **Ehb.**, Melosira Jurgensii K., M. nummuloides **Dillw.**, and Cocconeis Scutellum **Ehb.**

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[1]) Hedwigia 1873 p. 49.

[2]) Ostsee-Exp. 1871, p. 85.

[3]) GREG. Clyde, p.

[4]) Ostsee Exp. 1871, p. 87.

[5]) I have observed and examined such bays with quite fresh water but containing a diatomaceous flora of brackisch habitus on the south side of Rådmansö, Upland, where they are called »mar», and at Stansvik near Helsingfors. They seem to me to show how many swedish peatmosses have originated: a shallow little bay has been cut off from connection with the sea, its water has become fresh, brackish water diatoms and other microscopical plants and animals have formed silt, — when the silt nearly filled up the basin, Sphagnum and other higher plants have begun to grow there and have formed peat.

The nature of the bottom has also a great influence on the richness of the Diatomaceous vegetation, so that where the bottom consists of stones, these are wholly covered with a mucous film of diatoms. A bottom of clay or mud is clad with a velvetlike carpet of green algae and Diatoms, and when seaweed grows on it, this too is quite covered with diatoms. A sandy bottom, on the contrary, is quite sterile in respect of diatoms, and in similar localities, — for instance the shallow strand of Öland and the southern Skåne, — I have generally found no diatoms at all, save on the seaweed thrown up by the swell.

On open coasts, where rivers do not make the water very fresh, the diatomaceous vegetation of the Baltic is mainly composed of brackish species. Among these the most common are: Cocconeis Scutellum **Ehb.**, Achnanthes longipes **Lgb.**, Mastogloia lanceolata **Thw.**, Gomphonema balticum **Cl.**, Synedra pulchella K., and S. affinis K., Brebissonia Boeckii **Grun.**, Licmophoræ and Melosira Jürgensii K. Utterly common on similar localities are also Epithemia turgida EHB., E. sorex K., E. gibba EHB. and Roicosphenia curvata GRUN. which also occur in fresh water, where still I never found them in so enormous masses as in the Baltic. Somewhat less common are: Mastogloia Dansei v. eliptica C. AG., Navicula peregrina K. and N. Smithii BRÉB., Nitzschia Sigma K., N. punctata GRUN. and N. obtusa SM., Melosira nummuloides DILLW. and Grammatophora oceanica E.

But also real fresh water species occur commonly on the open coast; such are Cymbella Cistula HEMPR., Amphora ovalis K., Encyonema caespitosum K., Cocconeis Placentula E., Cymatopleura Solea E. (less common), Surirella ovata K., Staurosira mutabilis SM., Cyclotella Meneghiniana K., Navicula oblonga K., N. rhynchocephala K. and N. viridula K.

The fresh water flora of course increases very much in quantity and number of species in deep bays such as the Värtan near Stockholm, the Norrteljebay, the Bråviken a. o. and in such localities where numerous islets protect the coast against the open sea. In those localities such decided fresh water species are found, as Cymbella lanceolata EHB., C. gastroides K., Gomphonema constrictum EHB., G. acuminatum EHB., G. montanum SCHUM., G. dichotomum SM., G. tenellum K., Navicula hungarica GRUN., N. radiosa K., N. limosa K., Surirella angusta K., Melosira varians SM., and many others. Moreover in the same localities I have found a number of real marine species, such as Amphora sulcata GREG., A. lævis GREG., A. cymbifera GREG., A. granulata GREG., Navicula hyalina DONK., N. digitoradiata GREG., Chætoceros Wighami BTW., Pleurosigma Fasciola SM., Berkeleya Dillwynii AG., and some species of the genera Schizonema and Homoeocladia. These species generally occur on the open coast but some of them do not seem to be very sensible to fresh water. I have already stated that some of them occur in the shallow freshwater bays, above mentioned, but I have also, for instance, found, at Norrtelje in almost fresh water, such marine species as Navicula hyalina DONK., Hyalodiscus scoticus K. a. o. living together with the decided fresh water species Melosira varians SM., M. punctata SM., Gomphonema acuminatum and constrictum EHB. This is in direct opposition to the observation of LAGERSTEDT in his paper on marine diatomaceae from Bohuslän, p. 8, where he says that the depth has very little, the saltness of the water, a very great influence on the diatomaceous vegetation.

Besides these marine forms which occur rather commonly, there are some, which I almost never observed living, but which are very often found in the bottomclay, and always abundantly occur in the bathingsilt from Norrtelje, Furusund, Dalarö and Ronneby, as well as in some recent earths of eastern Upland, viz: the bottomsilt of the peatmosses, the mud from the bottom of some lakes in the same region and in the silty clay that sometimes forms the soil near Norrtelje. The same forms also occur very commonly in the postglacial clay that, from its colour, is called blackclay (svartlera). These forms are Hyalodiscus scoticus (K.) GRUN., Melosira Westii SM., M. sulcata EHB., Rhabdonema arcuatum K., Rh. minutum K., Coscinodiscus Oculus Iridis E. They are all real marine species which still occur very common in Kattegat and seem to have been very common in the Baltic, when it was in more open connection with the Ocean and its water therefore was salter, but which have grown less frequent, and finally almost disappeared as the water has become less salt.

Neither as living nor imbedded in mud or recent earths deposited in the Baltic, I have found such species as Actinoptychus undulatus K., Coscinodiscus excentricus E., C. lineatus E., Syndendrium Diadema E., Biddulphia aurita LGB., Rhabdonema adriaticum K., Surirella fastuosa E., Navicula Lyra E., N. fusca GREG., which are so common in the ocean, and also in the Kattegat characterize the diatomaceous vegetation.

Generally, when a marine species is left in a sea the water of which is gradually growing fresher, it becomes smaller and often crippled. The marine species occurring in the Baltic scarcely show any such degeneration, compared with the same species living in salt water, except that generally the striation is a little denser than in marine specimens. An exception makes Melosira Westii SM., of which the subfossil Baltic form is much smaller than that one from the marine habitats; the Baltic form measures about 0,01 mm. in diam., the marine, 0,02—0,04 mm. Quite the contrary is the case with Coscinod. polyacanthos GRUN. of which the Baltic form, — v. baltica GRUN. —, is bigger than the form occurring in the Arctic Sea. The species living both in brackish and in fresh water do not seem to follow any rule as to their relative dimensions.

An other question of some interest is that one, whether the diatomaceous vegetation is quite the same in all parts of the Baltic. From the Gulf of Bothnia I have had only few samples for examination and therefore I do not know its diatomaceous flora very well, but in the slides that I have examined, the fresh water species were predominant over the real Baltic ones. Regarding the vegetation of the rest of the Baltic, the freshwater species seem to decrease towards the south, so that, for instance, Cymbella Cistula HEMPR., Encyonema caespitosum K., Cymotopleura Solea SM. and others which are very common on the coast of Upland, are very scarce already in the Kalmar Sound and very rare on the coast of Skåne and Blekinge; on the other hand, the marine forms grow less frequent from the south to the north, so that, for instance, Melosira Borreri SM., M. nummuloides DILLW., Achnanthes longipes LGB., Licmophorae a. o. are common on the coast of Skåne and Blekinge but scarce more to the north. So some really marine species, such as Navic. directa SM. and N. cruciformis DONK., are found only in the southmost part of the Baltic.

Of the synonyms I have quoted only those which I have thought necessary for the distinct indication of the species, and those which are used in papers on Baltic diatoms. Moreover I have generally quoted the work that I have used for the determination of the species.

List of the Baltic Diatoms.

Ordo I. **Placochromaticæ.**

Fam. **Cocconeideæ.**

Cocconeis Ehb.

C. Scutellum Ehb.

Exceedingly common in the southern part of the Baltic, rather common on the coast of Roslagen, scarcely occurring in the Gulf of Bothnia and in the Finnish bay. Very seldom found in bays with almost freshwater: Norrtelje.

v. *stauroneiformis* Sm.

Sm. Syn. Vol. I, p. 22, Pl. III, fig. 34 a.

With the main species, not common.

C. Pediculus Ehb.

V. H. D. B. Pl. XXX, figg. 28—30.

Very seldom in the southern part of the Baltic: Sölvesborg, Gotland: Östergarn (Cleve); less rare in the Gulf of Bothnia: Rathan (Cleve), Haparanda (Cleve), Ångermanland: Näske (Cleve).

C. Placentula Ehb.

V. H. D. B. Pl. XXX, figg. 26, 27.

Common in all parts of the Baltic.

Besides the typical form that is also common in fresh water, another form occurs very commonly in the Baltic. This form I name

var. *baltica* nov. var.

Valve larger and more rounded than in the main species, striae distinct, about 15 in 0,01 mm., punctate. The puncta are dense on the inferior valve, on the upper valve they are more distant, forming 5—7 wavy, longitudinal rows. The frustule is plane or arched. Length 0,035—0,045 mm., breadth of the valve 0,025—0,03 mm. Plate I, figs 1 a—c.

Very common in the southern part of the Baltic, more scarce in the Gulf of Bothnia.

Schumann[1]), in his list of Prussian Diatomaceae, enumerates the following species as occurring in the Baltic:

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[1]) Preuss. Diat. 1867, p. 44.

C. pygmaea K.
C. oceanica K.
C. denudata K.
C. depressa K.
C. marginata K.
C. mediterranea K.
C. peruviana K.
C. baltica SCHUM.
C. tenera SCHUM.

As far as can be decided from KÜTZINGS small figures, Bac. Pl. 5, figs. VI and VIII, it seems as might C. pygmaea, marginata and depressa only be forms of C. Placentula or C. Pediculus, C. peruviana and C. mediterranea forms of C. Scutellum. C. oceanica K. is perhaps identic with my C. Placentula var baltica; the same seems the case be with C. tenera SCHUM., C. baltica SCHUM. is quite unknown to me. Perhaps it is a small form of N. elliptica K.

Fam. **Mastogloiaceæ.**

Mastogloia THW.

M. lanceolata THW.

This species seems to be very slightly different from M. Smithii THW., and those two forms seem also to be confounded or not quite well distinguished from each other by most authors. The figs. 340 and 341 in SMITH Syn. Pl. LIV seem to represent the same species. According to GRUNOW[1]) the difference between the freshwater species M. Smithii THW. and the marine M. lanceolata THW. is, that in the former the central nodule is dilated to the sides, else they are »überaus ähnlich». This does not agree with the figs. 13 and 14, Plate IV, in VAN HEURCKS Synopsis nor with the specimens of M. Smithii in CL. & MÖLL. Diat. N:o 86, if the dilated nodule does not signify the unstriated area that generally surrounds the central nodule. According to VAN HEURCKS Synopsis the main difference between the two forms seems to be, that M. lanceolata has its transversal striae quite parallel, M. Smithii, on the contrary, has them radiating. In the Baltic two forms occur, distinguished from each other only by the difference in outline; in both the striae are somewhat radiating. I refer them both to M. lanceolata Thw., because this species lives in salt water and because Grunow and Cleve [1]) have enumerated this species but not M. Smithii as occurring in the Baltic. The form, given in Cl. & Möll. Diat. N:o 86 as M. Smithii Thw., belongs to my var. amphicephala. The two forms, that I have found in the Baltic, are:

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[1]) GRUN. Verh. Wien 1860, p. 575, 576.

var. *elliptica.*
VH. D. B. Plate IV, figs. 16, 17.
Common in all parts of the Baltic. Plate I, fig. 2 a.
var. *amphicephala.*
Plate I, fig. 2 b.
Still more common than the previous var.

M. exigua Lewis.
VH. D. B. Pl. IV, figs 25, 26.
Not common: Gotl.: Östergarn (Cleve), Klintehamn, Åbo, Helsingfors, Travemünde, Öland: Mörbylånga, Vestervik.

M. Dansei Thw.
VH. D. B. Pl. IV, fig. 18.
Rare: Gotland: Tjeldervik (Cleve), Klintehamn.
var. *elliptica* (C. Ag.).
VH. D. B. Pl. IV, fig. 19.
As I am not quite sure that the form occurring in the Baltic is that one named by Ag., I give a figure of it in Pl. I, fig. 3.

Rather common: Malmö, Karlshamn, Öland: Mörbylånga, Gotland: Östergarn (Cleve), Kalmar, Vestervik, Oskarshamn, Oxelösund, Roslagen, Åbo. Found in the deep Norrtelje bay in almost fresh water, but not noticed in the Gulf of Bothnia.

M. Braunii Grun.
VH. D. B. Pl. IV, figs 21, 22.
Pl. I, fig. 4.
Not rare: Malmö, Sölvesborg, Kalmar, Öland: Mörbylånga, Gotland: Östergarn (Cleve), Oxelösund, Roslagen in brackish water. Norrtelje in almost fresh water.
var. *pumila* Grun.
VH. D. B. Pl. IV, fig. 23.
Rather rare: Sölvesborg, Travemünde, Gotland: Östergarn, Furusund, Åbo.

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[1]) Cl. Sv. o. N. Diat. p. 230.

Fam. **Achnantheae.**

Achnanthes Bory St. Vincent.

A. longipes Ag.

Grun. Arct. Diat. p. 18.

Very common on greater algae on the coasts of Skåne, Blekinge and Gotland, not rare in the Kalmar Sound, more scarcely occurring on the coasts of Södermanland and Upland and in the Finnish bay, not noticed in the Gulf of Bothnia.

v. *constricta* Grun.

Gotland: Östergarn (Cl.).

A. subsessilis Ag.

Arct. Diat. p. 18. VH. D.B. XXVI, fig:s 21, 22.

Pillau (Schum. 1867, p. 44); Travemünde (Ostsee Exp. 1871, p. 177), Malmö, Klintehamn.

A. brevipes Ag.

Arct. Diat. p. 18. VH. D. B. Pl. XXVI, fig:s 10—12.

Not common: Travemünde, Malmö, Karlshamn.

A. danica (Flögel) Grun.

Arct. Diat. p. 21.

In the Baltic (Arct. Diat.), Helsingfors.

A. lanceolata (Bréb.) Grun.

VH. D. B. Pl. XXVII, fig:s 8—11.

Helsingfors, Visby.

Fam. **Epithemieæ.**

Epithemia Ehb.

E. turgida (Ehb.) Kütz.

Utterly common in all parts of the Baltic. Never failing in the black-clay, etc.

var. *Westermanni* (E.) Kütz.

The most common form.

var. *Vertagus* (Kütz.) Grun.

VH. D. B. Pl. XXXI, fig. 7.

Very rare. Travemünde.

E. Zebra (Ehb.) Kütz.

var. *genuina* Grun.

Grun. Verh. Wien 1862, p. 328.

Rare: Upland: Blidö. Subfoss.: Bathing silt from Dalarö.

var. *Saxonica* (KÜTZ.) GRUN.
GRUN. l. cit.
Rare: Rostock, Travemünde, Sölvesborg, Helsingfors.
var. *Porcellus* KÜTZ.
GRUN. l. cit.
Very common everywhere in the Baltic.
var. *proboscidea* GRUN.
GRUN. Verh. Wien 1862, p. 329; nec GRUN. in VH. D. B. Pl. XXI, f. 10.
Not common: Sölvesborg, Roslagen, Vesterbotten: Rathan.

E. Argus KÜTZ.
VH. D. B. Pl. XXX, fig:s 15—17.
Rare: Gotland: Slite (CLEVE), Roslagen.

E. intermedia HILSE.
Rare: Upland: Riddersholm.

E. gibba EHB.
var. *genuina* GRUN.
GRUN. Verh. Wien 1862, p. 327.
var. *ventricosa* (KÜTZ.) GRUN.
GRUN. Verh. Wien 1862, p. 327.
Both varr. very common at the open coast as well as in bays with almost fresh water. On the contrary var. parallela GRUN. seems to be quite failing in the Baltic.

E. Sorex KÜTZ.
Utterly common.

E. gibberula EHB.
var. *Musculus* K.
GRUN. Verh. Wien 1862, pag, 331.
Very varying in size. L. 0,015—0,05 mm.
Rare: Gotland: Östergarn (CLEVE), Klintehamn, Upland: Blidö, Travemünde (f. minutissima).
var. *rupestris* (SM.) GRUN. l. cit.
Rare: Travemünde.

E. constricta SM.
SM. Syn. Plate XXX, fig. 248.
Very rare: Malmö (CL. & MÖLL. Diat. N:o 136), Travemünde.

E. baltica SCHUM.

SCHUM. 1862, p. 183, Pl. VIII, fig. 5.

Harbour of Pillau (SCHUM. l. cit.). Unknown to me. Is perhaps E. gibberula EHB. var. producta GRUN.

Fam. **Amphoreæ.**

Amphora EHB.

A. ovalis K.

Rare in the southmost parts of the Baltic: Travemünde. Grows less rare towards the north, on the open coast and in deep bays with almost fresh water: Gotland: Östergarn (CLEVE), Klintehamn, Vestervik, Kalmar, Roslagen.

A. salina SM.

SM. Syn. Pl. XXXI, fig. 251.

Rare Gotland (CL. & MÖLLER Diat. N:o 86), in the Kalmar sound, Roslagen, Helsingfors.

A. angusta GREG. f. minuta.

SCHM. Atl. Pl. 21, fig:s 65, 66; Pl. II, fig. 10.

About the half as big as Schmidts fig:s.

Very rare: Vestervik.

A. macilenta GREG.

GREG. Clyde p. 38, Pl. IV, fig. 65.

Plate I, fig. 6.

Agrees very well with the description given by GREGORY, except that the striæ of the Baltic form are denser, 22—24 in 0,01 mm. From GREGORYS figure it differs by its very distinct central nodule.

Rare: Oskarshamn, Vestervik, Kalmar, Gotl.: Klintehamn.

A. cymbifera GREG.

GREG. Clyde p. 54.

I have found only the var. with the punctation of the striæ scarcely visible. Striæ 11—12 in 0,01 mm. Represented in SCHM. Atl. Pl. 25, fig:s 33—35.

Rare: Gotland: Östergarn (CL.), Klintehamn, Kalmar, Vestervik, Roslagen: Blidö and Rådmansö.

Subfossil: not rare in silt from the bottom of peat mosses in Roslagen.

A. robusta Greg.

Schm. Atl. Pl. 27, fig:s 38—41.

Rare: Södertelje (Schm. Atl.), Upland: Riddersholm.

Subfossil: Bathing silt from Dalarö.

var. *minor* n. var.

Schm. Atl. Pl. 27, fig. 38.

Pl. II, fig. 7.

Differs from the main species by the indistinctly punctate striæ, 11—13 in 0,01 mm.

Rare: Malmö, Sölvesborg.

Subfossil: Bathing silt from Dalarö, recent silt in the peatmosses in Roslagen.

A. staurophora nov. spec.

Plate I, fig. 9.

Little, hyaline. Side view eliptical or oval, inner border of the valve straight or a little incurved. Valve with a stauros that widens towards the dorsal side. Length 0,014 mm. Unstriated. Connecting membrane with one longitudinal furrow.

Very rare: Vestervik.

A. sulcata (Bréb.) Greg.

Greg. Clyde Pl. V, fig. 92. Schmidt Atl. Pl. 26, figs 46, 47.

Plate II, fig. 8.

Like the figs in Schmidts Atlas, differs from Gregorys quoted figure by its very conspicuous central nodule. Striæ very fine.

Rare: Gotland: Slite, Helsingfors, Kalmar, Vestervik.

A. granulata Greg.

Greg. Clyde Pl. VI, fig. 96.

Rare: Vestervik, Gotland: Klintehamn.

A. lævis Greg.

Greg. Clyde Pl. IV, fig. 74. Plate ~~II~~ I, fig. 5.

Rare. Gotland: Klintehamn, Vestervik, Kalmar.

Fam. Cymbelleæ.

Cymbella Ag.

C. lanceolata E.

Only in slightly brackish water. Rostock, Vaxholm (Cleve), Rathan (Cleve).

C. cymbiformis K.

SCHM. Atl. Plate X, fig. 13.

Rare: Gotland: Tjeldervik, Norrtelje, Helsingfors.

C. parva (SM.).

SCHM. Atl. Pl. X, fig:s 14, 15.

Fresh water species rarely occurring in slightly brackish water. Harbour of Travemünde (Ostsee Exp. 1871, p. 177), Gotland (CL. & MÖLL. Diat. N:o 86).

C. Boeckii K.

SCHM. Atl. Pl. X, fig. 11.

Gotland: Klintehamn, Helsingfors, Rathan (CL.).

C. *Cistula* HEMPR.

SCHM. Atl. Pl. X, fig:s 25, 26.

Fresh water species that occurs rather commonly as far to the south as on the shore of Upland and in the Finnish bay, but only the long var. represented in SCHM. Atl. Pl. X, fig. 26. South of Upland it seems to be very rare. The short form, — SCHM. Atl. Pl. X, fig. 25 —, I have found only in a gathering from Rostock.

C. gastroides K.

SCHM. Atl. Pl. IX, fig:s 1, 2.

Fresh water species, in almost fresh water: Rostock.

C. helvetica K.

GRUN. Arct. Diat. p. 26.

SCHM. Atl. Pl. X, fig. 18.

In the Gulf of Bothnia: Haparanda (CL.), Rathan (CL.), Ångermanland: Näske (CL.). South of it very rare: Blidö, in the slightly brackish water of Rostock and Travemünde.

C. turgidula GRUN.

SCHM. Atl. Pl. IX, fig. 25.

In the slightly brackish water at Rostock.

C. affinis K.

VH. D. B. Pl. II, fig. 19.

Gulf of Bothnia: Haparanda (CL.), Rathan (CL.), Ångermanland: Näske (CL), Helsingfors.

C. obtusa GREG.
SCHM. Atl. Pl. IX, fig:s 41—45.
Gotland (CL. & MÖLL. Diat. N:o 86), Klintehamn.

C. pusilla GRUN.
SCHM. Atl. Pl. 9, fig:s 36, 37.
Rare: Gotland: Bogevik (CLEVE), Östergarn (CLEVE), Klintehamn, Malmö.

C. salinarum GRUN.
SCHM. Atl. Pl. 9, fig. 28.
Very rare: Helsingfors.

Encyonema K.

E. cæspitosum (K.) SM.
Not found in the south part of the Baltic; common in the Gulf of Bothnia, in the Finnish bay and on the coast of Roslagen: Rathan (CL.), Helsingfors, Vaxholm, Norrtelje.
v. *ovata*.
SCHM. Atl. Pl. X, fig:s 45, 46.
Helsingfors, Upland: Blidö.

E. prostratum RALFS.
SCHM. Atl. Pl. 10, fig:s 64—69.
Rathan (CLEVE), Vaxholm (CL.).

E. ventricosum K.
Haparanda (CL.).

Fam. Gomphonemaceæ.

Gomphonema AG.

G. acuminatum EHB.
In the slightly brackish water at Norrtelje.

G. constrictum EHB.
In the scarcely brackish water at Vaxholm (CL.) and Norrtelje.

G. montanum SCHUM.
Gotland: Slite (CL.).

G. subtile EHB.
In the Baltic (SCHUM. 1862).

G. angustatum (K.) GRUN.
Norrtelje.

G. dichotomum SM.
Rathan (CL.).
var. *intricatum* (K.).
Rathan (CL.).

G. tenellum K.
Rathan (CL.).

G. olivaceum EHB. var. *salinum.*
Ångermanland: Näske (CL.).

G. balticum CL.
VH. D. B. Pl. XXV, fig. 24.
Utterly common in all parts of the Baltic.

Rhoicosphenia GRUN.

Rh. curvata (K.) GRUN.
Very common in brackish and in almost fresh water, especially on greater algae.

Rh. fracta var. *baltica* SCHUM.
SCHUM. 1867, Pl. I, fig:s 19 a—c.
Very rare. Gotland: Fridhem.

Fam. **Naviculaceæ.**

Navicula BORY S:T VINC.

N. gentilis DONK.
DONK. Brit. Diat. Pl. XII, fig, 1.
Very rare. Upland: Blidö.

N. major. KÜTZ.
SCHM. Atl. Pl. 42, fig. 17.
In scarcely brackish water: Rostock, Vaxholm (CL.), Norrtelje.

N. viridis NITZSCH.
SCHM. Atl. Pl. 42, fig. 11.
Rare. Rathan (CL.).
Subfoss.: Upland: recent silt in Blidö.
v. *commutata* GRUN.
Rare. Kalmar.
Subfoss.: Upland: in alluvial clay from Järsö.

N. Brebissonii Kütz.
VH. D. B. Pl. V, fig. 7.
Rathan (Cl.).
Subfossil: Upland: diatomaceous deposit in Blidö.

N. mesolepta Ehb.
Grun. Verh. Wien 1860, p. 520.

According to the exposition of this species given by Grunow (loc. cit.), I refer to it N. Termes Ehb., N. bicapitata L:dt a. o. which are very slightly distinct from one another.

var. *nodulosa* (K.) Grun.
Grun. loc. cit. p. 120.

Rare: Harbour of Travemünde (Ostsee Exp, 1871, p. 177), Sölvesborg.

var. *constricta* Grun.
N. Termes var. stauroneiformis VH. D. B. Pl. VI, fig. 12.
Norrtelje, Helsingfors, Blidö in Upland.

N. borealis Kütz.
Helsingfors in slightly brackish water.

N. appendiculata (Ag.) Kütz.
VH. D. B. Pl. VI, fig:s 18—20.
Gotland: Slite (Cl.).

N. Pinnularia Cl. v. *baltica* Grun.
In the Baltic (Arct. Diat. p. 27).
v. *subproducta* Grun.
In the Baltic (Arct. Diat. p. 27).

N. subcapitata Greg. v. *stauroneiformis*.
VH. D. B. Pl. VI, f. 22.
Gotland: Tjeldervik (Cl.).

N. cruciformis Donk.
Travemünde.

N. hungarica Grun.
Arct. Diat. p. 27.
In the almost fresh water of Norrtelje, Haparanda (Cl.).
v. *humilis* (Donk.) Grun.
Arct. Diat. p. 27.
N. globiceps L:dt Spb. Pl. II, fig. 25.
Norrtelje with the former, Karlshamn, Haparanda.

N. digitoradiata GREG.
Arct. Diat. p. 32.
Somewhat rare: Malmö, Sölvesborg, Travemünde, Gotland: Bogevik (CL.), Upland.
Subfoss.: In silty clay from eastern Upland.

N. cyprinus (SM.) GRUN.
Vaxholm (CL.).

N. bothnica GRUN.
Arct. Diat. p. 32.
Ångermanland: Näske (CL.), Hernösand (CL. & MÖLL. Diat. N:o 237), Rathan (CL.), Haparanda (CL.), Helsingfors, Karlshamn.
Subfoss.: Upland: in recent silt from Rådmansö.

N. Placentula EHB. var. *subsalsa* GRUN.
Arct. Diat. p. 34; VH. D. B. Pl. VIII, f. 31.
Rare: Helsingfors (little form with 17 striae in 0,01 mm.), Gotland: Klintehamn.

N. peregrina KÜTZ.
VH. D. B. Pl. VII, fig. 2.
Common in all parts of the Baltic: Rathan (CL.), Åbo, Helsingfors, Roslagen, Vaxholm, Gotland: Östergarn (CL.) and Klintehamn, Karlshamn, Sölvesborg, Kiel (SCHM. Atl. Pl. 47).
var. *Meniscus* SCHUM.
According to GRUNOW — Arct. Diat. p. 33 — it is common in the Baltic. I found it only at Helsingfors in almost fresh water.

N. Menisculus SCHUM.
In the Baltic (SCHUM. 1867).

N. rhynchocephala KÜTZ.
Arct. Diat. p. 33.
Not rare. On the open coast and in bays. Rathan (CL.), Upland, Helsingfors, Södermanland: Häringe, Dalarö, Gotland: Östergarn, Klintehamn.
Subfoss.: Bathing slick from Norrtelje, silt in the peatmosses of Roslagen.
v. *amphiceros* KÜTZ.
Arct. Diat. p. 33.
SCHM. Atl. Pl. XLVII, f. 25.

As the former. Rathan (Cl.), Åbo, Norrtelje, Dalarö, Gotland: Östergarn (Cl.), Klintehamn, Karlshamn, Sölvesborg.

N. oblonga Kütz.

VH. D. B. Pl. VII, fig. 1.

In slightly brackish water. Rathan (Cl.), Ångermanland: Näske (Cl.), Upland: Rådmansö, Södertelje (Cl.), Gotland: Slite (Cl.), Klintehamn, Rostock.

Subfoss.: bathing silt from Dalarö.

N. viridula Kütz.

Arct. Diat. Pl. II, fig. 35.

Rather common in the Baltic: Karlshamn, Gotland: Slite (Cl.), Klintehamn, Södertelje (Cl.), Norrtelje, Helsingfors.

N. radiosa Kütz.

Gotland: Slite (Cl.), Klintehamn, Norrtelje.

N. dicephala Kütz.

Rare: Karlshamn, Gotland: Klintehamn, Helsingfors.

Subfossil: In alluvial clay from Wassunda, Upland.

N. gracilis (K.) Grun.

VH. D. B. Pl. VII, fig:s 7—10.

Helsingfors, Bråviken, Malmö.

N. scutelloides Sm.

In the Baltic (Schum. 1862).

N. cincta Ehb.

VH. D. B. Pl. VII, fig. 14.

Rare: Malmö (Cl. & Möll. Diat. N:o 107), Gotland: Bogevik (Cl.); Åbo.

v. *Heufleri* Grun. VH. D. B. Pl. VII, fig. 15.

Malmö (Cl. & Möll. Diat. N:o 107), Gotland: Slite (Cl.), Klintehamn, Helsingfors.

v. *leptocephala* Bréb.

VH. D. B. Pl. VII, fig. 16.

Klintehamn.

N. cryptocephala K.

VH. D. B. Pl. VIII, fig:s 1 and 5.

Helsingfors, Gotland: Klintehamn.

var. *latior* nov. var. Plate II, fig. 12.

Valve broadly lanceolate, with capitate ends, striae highly radiating even at the ends, 22 in 0,01 mm.

Helsingfors, Visby, Klintehamn.
var. *exilis* (KÜTZ.) GRUN.
VH. D. B. Pl. VIII, fig. 2.
Helsingfors.

N. Thurholmensis nov. spec.
Plate I, fig. 11.

Valve lanceolate, with produced, capitate ends. Striae very fine, 26 in 0,01 mm., transversal, reaching the median line.

Belongs to the group of Nav. cryptocephala and seems to stand nearest to N. gregaria DONK., but differs by the capitate ends and the fine, quite transversal striae.

Very rare: At Thurholm near Helsingfors.

N. arenaria DONK.
VH. D. B. Pl. VIII, fig. 18.
Sölvesborg, Karlshamn.

N. divergens SM.
Gotland: Klintehamn, a linear form with broad, rounded extremities. Plate II, fig. 13.

N. limosa K.
VH. D. B. Pl. XII, fig. 18.
Gotland: Slite (CL.), Södertelje (CL.), Rathan (CL.).

N. ventricosa DONK.
DONK. Brit. Diat. p. 74, Pl. XII, fig. 7.
Karlshamn, Kalmar, Gotland (CL. & MÖLL. Diat. N:o 86). Only in almost fresh water.

N. subdivisa GRUN.
In the Baltic (GRUN. Arct. Diat. p. 29).

N. palpebralis BRÉB.
VH. D. B. Pl. XI, fig. 8.
Very rare. Ystad.

N. elegans SM.
SM. Syn. Pl. XVI, fig. 137.
Rathan (CL.).

N. amphisbœna BORY.
VH. D. B. Pl. XI, fig. 7.
Harbour of Visby.

Through the great convexity of the valve of this and the two subsequent species, which scarcely ought to be retained as separate species, the striae seem to run in a double bow, and those at the extremities appear running in a direction opposite those nearer the middle of the valve. Striae 16—17 in 0,01 mm. in all these three forms, thus denser as in the fig:s in VH. D. B.

var. *subsalina* Donk.
VH. D. B. Pl. XI, fig. 7.
Helsingfors, Norrtelje, Gotland: Klintehamn, Kalmar. The fig. 14, Plate II shows a broad from passing into the next.

var. *Fenzlii* Grun.
VH. D. B. Pl. XI, fig. 5.
Rathan (Cl.), Helsingfors, Gotland: Klintehamn.

N. Holmiensis Cl.
Cl. New Diat. p. 8, Pl. II, fig. 18.
In slightly brackish water at Vaxholm (Cl.).

N. ovulum Grun.
In the Baltic (Schum. 1867).

N. crucicula (Sm.) Donk. f. minor.
VH. D. B. Pl. X, fig. 15.
In the slightly brackish water of Bråviken and at Vaxholm (Cl.).

N. crucifera Grun.
In the Baltic (Schm. Atl. Pl. 46, fig. 50).

N. directa (Sm.).
Pinnularia Sm. Syn. Pl. XVIII, fig. 172.
Kiel (Schm. Atl. Pl. 47, fig. 5), Karlshamn.

N. distans Sm.
Harbour of Travemünde (Ostsee Exp. 1871, p. 177).

N. Cluthensis Greg.
Subfossil: Upland: in silt from Rådmansö.

N. pusilla W. Sm.
VH. D. B. Pl. XI, f. 17.
In the Baltic (Schum. 1867), Gotland: Klintehamn.

N. punctata Donk.
Gotland: Östergarn (Cl.), Vaxholm (Cl.), Rathan (Cl.), Haparanda (Cl.).

N. latissima GREG.

Travemünde.

N. humerosa BRÉB.

VH. D. B. Pl. XI, fig. 20.

Sölvesborg, Gotl.: Östergarn, Harbour of Pillau (SCHUM. 1867).

v.? *fuscata* SCHUM.

F. Habirshaw in his catalogue refers SCHUMANNS species to N. humerosa BRÉB., with which it seems to have very little resemblance. The striae are much denser and not alternately shortened as in N. humerosa.

In the Baltic (SCHUM. 1867).

N. marina RALFS.

VH. D. B. Pl. XI, f. 16.

Travemünde, Pillau (SCHUM. 1867), Gotland: Klintehamn, Södermanland: Häringe, Helsingfors.

N. sphærophora K.

VH. D. B. Pl. XII, f. 2.

Ringkjöbing (SCHM. Atl. Pl. 49), Södertelje (SCHM. l. cit.).

Subfoss.: Upland: in silt from peatmosses; in shell bed of Hellsbo kärr in Södermanland.

N. sculpta E.

SCHM. Atl. Pl. 49, fig. and

N. bohemica E.

SCHM. Atl. Pl. 49, fig.

seem to be very slightly distinct from one another and ought to be united as one species. Both in respect of the outline of the valve and of the symmetry and extent of the unstriated area they pass gradually in one another.

Not common. Generally in almost fresh water. Gotland: Bogevik (CL.), Södermanland: Häringe, Södertelje (CL.), Upland: Rådmansö.

Subfoss.: Upland: in silt from peatmosses.

N. cuspidata K.

SM. Syn. Pl. XVI, fig. 131. VH. D. B. Pl. XII, f. 4.

In brackish and almost fresh water: Malmö, Karlshamn, Rostock, Södertelje, (CL.) Upland: Blidö.

N. Smithii BRÉB.

SCHM. Atl. Pl. 7.

Common but generally only as single specimens, never in greater masses. On the open coast and floating on the surface of the sea. Very common in bottom-mud.

Subfoss.: Dalarö bathing silt.

var. *lævis* nov. var. Plate II, fig. 15.

Striae unpunctate. Else as the main species, varies as this in outline and in the form of the longitudinal lines.

With the main species, less common.

N. eliptica K.
N. Parmula Bréb. in Schum. 1867.
In the Baltic (Schum. 1867), Gotland: Klintehamn.

N. didyma K.
Donk. Brit. Diat.
Occurs as N. Smithii. Travemünde (Ostsee Exp. 1871, p. 177), Gotland: Östergarn (Cl.), Slite (Cl.), Kalmar, Sölvesborg.

N. Bombus (Greg.) Donk.
Donk. B. D. pag. 50, Pl. VII, fig. 7.
N. gemina A. Schm. Atl. Pl. XIII.
Very rare: At Kalmar I found a very small form, quite resembling the fig. 7 in Schm. Atl. Pl. XIII.

N. Apis (E.) Donk.
Donk. Brit. Diat.
Very rare: Travemünde.

N. Crabro K.
In the Baltic (Schum. 1867).

N. interrupta (K.) Donk.
Scarce in all parts of the Baltic: Gotl.: Östergarn (Cl.), Södertelje (Cl.), Upland: Blidö, Hernösand (Cl.).
Subfoss.: in silty clay from Rådmansö, Upland.

N. hyalina Donk.
Donk. Brit. Diat. p. 5, Pl. I, f. 1.
Not rare. On open coasts: Öland: Mörbylånga, Vestervik, Helsingfors. In bays with almost fresh water: Norrtelje, Helsingfors (Thölö).

N. Pupula (K.) Grun.
Gotland (Cl. & Möll. Diat. N:o 86).

v. *bacillarioides* Grun.
Arct. Diat. p. 45.

Rare. Upland: Blidö.
Subfossil: Upland: silt from Möja.

N. fusiformis GRUN. v. *Ostrearia.*
Amphipleura danica (K.) TURP.
In the Baltic (SCHUM. 1867).

SCHUMANN, in his list of Prussian Diatoms, 1867, mentions the following, to me quite unknown species, as occurring in the Baltic:

N. macrocephala SCHUM.
N. Sambiensis SCHUM.
N. Granum Avenæ SCHUM.
N. italica K.
N. Ceres SCHUM.
N. Puella SCHUM.
N. Trunculus SCHUM.
N. aperta SCHUM.
N. candida SCHUM. possibly = N. hungarica GRUN.

Colletonema BRÉB.

C. subcohærens SM.
Fresh water species, found in the Gulf of Bothnia at Rathan (CL.) and Hernösand (CL.).

Schizonema AG.

? *Sch. parvum* MENEGH.
VH. D. B. Pl. XV, fig. 30, Plate II, fig. 17.

Frustules without order crowded in the tube. Valve broadly lanceolate, striae conspicuous (punctate?), in the middle much, at the ends slightly radiating. Side view rectangular with obtuse angles.

I have not been able to determine this form surely, but it seems to be very like the quoted fig. in VH. D. B.

Rare: Vestervik.

Sch. Smithii C. AG.
VH. D. B. Pl. XV, fig. 33, Pl. II, fig. 16.

Frustules arranged in a single row, with the ends reaching a little at the side of one another. Valve linear-lanceolate, gradually tapering towards the rounded ends. Striae radiate in the middle, divergent at the ends, leaving a little unstriated area round the central nodule. Striae 14 in 0,01 mm. L. 0,04 mm., br. 0,009 mm.

Rare: Kalmar.

Stauroneis Ehb.

S. Phoenicenteron Ehb.
Norrtelje in almost fresh water.

S. Gregorii Ralfs.
S. amphioxys Greg. Arct. Diat. Pl. III, fig. 64.
Rare: Norrtelje, Karlshamn, Kalmar.

S. anceps Ehb.
VH. D. B. Pl. IV, fig:s 4, 5.
Harbour of Karlshamn.

S. salina Sm.
VH. D. B. Pl. X, fig. 16.
Södermanland: Häringe.
var. *latior* nov. var.
Plate III, fig. 21.
Valve broadly lanceolate, with a little produced ends.
Helsingfors.

S. amphoroides Grun.
Amphora constricta.
Malmö (Cl. & Möll. Diat. N:o 27). In the Baltic (Schum. 1867).

S. hyalina nov. spec.
Plate III, fig. 20.

Hyaline. Valve linear-lanceolate. Stauros linear, reaching the margin. Striae very fine, only a few ones near the stauros conspicuous. Length 0,067—0,07 mm., breadth of stauros 0,001 mm.

Rare: Kalmar, Helsingfors (common).

S. platystoma Ehb.
Gotland: Östergarn (Arct. Diat. p. 14).

S. Legumen E. f. minuta.
Gotland (Cl. & Möll. Diat. N:o 86).

Scoliopleura Grun.

S. Jenneri Grun.
In the Baltic (Schum. 1867).

Pleurosigma Sm.

P. elongatum Sm.
Arct. Diat. p. 50. VH. D. B. Pl. XVIII, f. 7.
Harbour of Travemünde (Ostsee Exp. 1871, p. 177), Kalmar, Vestervik, Helsingfors.

P. æstuarii Sm.
Malmö (Cl. & Möll. Diat. N:o 136).
v. *minutum* Grun.
In the Baltic (Schum. 1867).

P. strigosum Sm.
In the Baltic (Schum. 1867).

P. Nubecula Sm.
In the Baltic (Schum. 1867).

P. intermedium Sm.
In the Baltic (Schum. 1867).

P. attenuatum Sm.
Grun. Arct. Diat. p. 54.
Södermanland: Häringe, Helsingfors.
Subfoss.: Furusund bathing slick.

P. Hippocampus Sm.
Arct. Diat. p. 54; VH. D. B. Pl. XX, fig. 3.
In the harbour of Travemünde (Ostsee Exp. 1871, p. 177).

P. Fasciola Sm.
VH. D. B. Pl. XXI, fig. 8.
In the harbour of Travemünde (Ostsee Exp. 1871, p. 177), Kalmar.

P. acuminatum Sm.
In the Baltic (Schum. 1867).

P. Brebissonii Grun.
VH. D. B. Pl. XXI, f. 6.
Kalmar.

P. Spenceri Sm.
Vaxholm (Cl.), Malmö (Cl.), Helsingfors.

P. distortum Sm.
Vaxholm (Cl.).

Schum. 1867 mentions as occurring in the Baltic the following to me unknown species:

P. candidum SCHUM.
P. Scalpellum PRITCH.
P. bistriatum SCHUM.

Endosigma BRÉB.

E. eximium THW.
VH. D. B. Pl. XXI, fig. 2.
Very rare. In slightly brackish water. Upland: Blidö, Rathan (CL.).

Amphiprora EHB.

A. paludosa SM.
VH. D. B. Pl. XXII, fig. 10.
Not rare: Gotland: Klintehamn, Kalmar, Vestervik, Södermanland: Häringe, Helsingfors, Hernösand (CL.), Rathan (CL.), Haparanda (CL.).

A. duplex DONK.
VH. D. B. Pl. XXI, fig. 15, 16.
Vestervik, Kalmar, Helsingfors.

A. alata EHB.
Harbour of Travemünde (Ostsee Exp. 1871, p. 177).

? *A. plicata* GREG.
GREG. Clyde Pl. IV, fig. 57; Arct. Diat. p. 65.

Frustules deeply constricted; extremities broad, somewhat rounded; inner margin of the valve forms a double bow. No longitudinal sulci to be seen on the connecting membrane. Valve lanceolate, acute; transverse striae on the valves and the connecting membrane 16 in 0,01 mm., consisting of puncta that also form longitudinal lines, 18 in 0,01 mm. Length 0,120—0,130 mm., breadth of the valve 0,019 mm.

I am not quite sure that the form that I have found, is the true A. plicata GREG., because the fig. quoted is drawn in a too little scale and shows the frustule only in front view. I therefore give a fig. of the Baltic form Pl. II, fig. 18.

Rare: Vestervik, Kalmar.

Fam. **Amphipleureæ.**

Amphipleura K.

A. pellucida K.
VH. D. B. Pl. XVII, f. 14.

Gotland: Klintehamn, In the Baltic, form sporang. (SCHUM. 1867).

A. rigida K.
In the Baltic (SCHUM. 1867).

Berkeleya GREV.

B. rutilans (TRENT.) GRUN.
var. *crinoidea* (HARV.) GRUN. Botan. Central-Blatt $^{47}/_{48}$ 1880.
Gotland: Slite (CL.).

B. fennica nov. spec.
Pl. II, f. 19.
Little, hyaline. Valve linear-lanceolate with rounded ends. Striae inconspicuous. Length 0,017 mm., breadth of the valve 0,003 mm. No thallus found.
Helsingfors.

Brebissonia GRUN.

B. Boeckii EHB.
Common in the southern part of the Baltic, less common on the coasts of Södermanland and Upland, not found in the Gulf of Bothnia, not rare in the Finnish bay.

Fam. **Nitzschieæ.**

Nitzschia HASS.

N. punctata (SM.) GRUN.
GRUN. Arct. Diat. p. 68.
Malmö, Upland: Rådmansö, Norrtelje. Common in bottomclay and in silt and silty clay from Upland, in blackclay from eastern Sweden.
var: *elongata* GRUN.
In the Baltic (Arct. Diat. p. 68).

N. navicularis (BRÉB.).
In the Baltic (SCHUM. 1867).

N. Tryblionella HANTSCH.
Vaxholm (CL.), Norrtelje.
v. *ambigua* GRUN.
Arct. Diat. p. 69.
Helsingfors.

v. *Levidensis* (Sm.) Grun.

Arct. Diat. p. 70. VH. D. B. Pl. LVII, fig. 15.

Very often constricted in the middle. Striae 12—14, — denser than is stated in Grun. Arct. Diat.

Gotland: Östergarn (Cl.), Vaxholm (Cl.), Helsingfors.

N. angustata Sm.

Grun. Arct. Diat. p. 70.

Freshwater species, sparingly occurring in scarcely brackish water.

Rathan (Cl.).

Tryblionella Neptuni Schum.

Schum. 1867, pl. I, fig. 11.

I have not been able to identify this species with any other one known to me.

In the Baltic (Schum. 1867).

N. Panduriformis Greg.

In the Baltic (Schum. 1867).

N. plana Sm.

In the Baltic (Scum. 1867).

N. constricta Greg.

In the Baltic (Schum. 1867).

N. marginatula Grun. v. *genuina*.

In the Baltic (Grun. Arct. Diat. pag. 72).

N. hungarica Grun.

VH. D. B. Pl. LVIII, f. 20.

Harbour of Travemünde (Ostsee Exp. 1871, p. 177), Malmö, Vaxholm (Cl.), Gotland: Klintehamn, Helsingfors.

N. apiculata (Greg.) Grun.

VH. D. B. Pl. LVIII, fig. 26, 27. Arct. Diat. p. 73.

Travemünde, Gotland: Slite (Cl.), Upland: Blidö, Helsingfors.

N. acuminata Sm.

Harbour of Pillau (Schum. 1867).

N. litoralis Grun. Arct. Diat. p. 75.

Helsingfors.

v. *Tergestina* Grun.

Arct. Diat. p. 75.

Södermanland: Häringe.

N. circumsuta BAIL.
Arct. Diat. p. 77.

Not common. In almost fresh water. Södermanland: Häringe, Södertelje (CL.), Upland: Vaxholm (CL.), Rådmansö.

Subfoss.: diatomaceous deposit at Christianstad.

N. dubia SM.
In the Baltic (CL. Sv. o. N. Diat.).

N. thermalis K.
Rathan (CL.).
v. *minor* HILSE.
Helsingfors.

N. hybrida GRUN.
In the Baltic (Arct. Diat. p. 79); Gotland: Slite (CL.).

N. epithemioides GRUN.
Malmö (CL.).

N. Denticula GRUN.
Rathan (CL.).

N. Scalaris SM.
SM. Syn. Pl. XIV, fig. 115.

Sölvesborg, Södertelje (CL.), Vaxholm (CL.), Upland: Rådmansö.

Never failing in the blackclay, in the silty clay and in the silt from the peat mosses in eastern Upland, and in the bathing silt from Norrtelje, Furusund, Dalarö and Ronneby.

N. socialis GREG. v. baltica GRUN.
In the Baltic (Arct. Diat. p. 85).

N. paradoxa (GMEL) GRUN.
N. paxillifer O. F. MÜLL. HEIB. Consp. p. 113.

Not rare in the southern part of the Baltic: Malmö, Sölvesborg, Kalmar, Gotland: Klintehamn; very rare north of the Kalmar Sound: Helsingfors.

N. sigmoidea EHB.
Södertelje (CL.).

N. Brebissonii SM.
Slightly brackish water: Kiel (Arct. Diat. p. 91).

N. spectabilis SM.
In the Baltic (SCHUM. 1867).

v. *armoricana* (K.) Grun.
Rathan (Cl.).

N. Sigma K.
Common. Harbour of Travemünde (Ostsee Exp. 1871, p. 177), Karlshamn, Kalmar, Gotland: Klintehamn, Norrtelje, Helsingfors, Åbo.

N. anguillula Schum.
In the Baltic (Schum. 1867).

N. obtusa Sm. incl. N. Schweinfurthii Grun.
Common. Malmö, Karlshamn, Kalmar, Upland: Blidö, Ångermanland: Näske (Cl.), Rathan (Cl.), Gotland: Slite (Cl.).

v. *lepidula* Grun.
Vesterbotten (Arct. Diat. p. 92).

N. linearis Sm.
Rathan (Cl.).
v. *gracilenta* Grun.
Rathan (Cl.).

N. vitrea Normann.
VH. D. B. Pl. LXVII, f. 10. Arct. Diat. p. 94.
Kalmar, Gotland: Slite (Cl.), Klintehamn, Östergarn (Cl.).

N. lanceolata Sm.
Gotland: Bogevik, f. parva, angusta (Cl.).

N. subtilis v. *paleacea* Grun.
VH. D. B. Pl. LXVIII, fig:s 9, 10.
Helsingfors.

N. Kützingiana Hilse.
VH. D. B. Pl. LXIX, fig:s 24–26.
In slightly brackish water: Kiel (Arct. Diat. p. 97), Upland: Blidö, Helsingfors.
v. *exilis* Grun.
VH. D. B. Pl. LXIX, fig. 27.
Helsingfors.

N. Closterium Sm.
Blekinge: Thorhamn, Gotland (Cl. Sv. o. N. Diat.), Vestervik.

N. reversa Sm.
In the Baltic (Schum. 1867).

N. gracilis Bréb.
Harbour of Pillau (Schum. 1867).

N. acicularis v. *Closterioides* Grun.
Arct. Diat. pag. 101. VH. D. B. Pl. LXX, f. 9.

The beaks about as long as the middle part of the valve, bent in the same or opposite direction.

Helsingfors.

Hantschia Grun.

H. amphioxys (E.) Grun.
Gotland: Tjeldervik (Cl.).

H. virgata Rop.
Upland: Blidö.

Homoeocladia Ag.

H. filiformis Sm.
Harbour of Pillau (Schum. 1867).

H. biceps Schum.
Harbour of Pillau (Schum. 1867).

H. baltica nov. sp.
Plate III, f. 22.

Frustules two and two beside in the tube. V. lin. with rounded ends. Length 0,011—0,014 mm., breadth 0,001 mm. puncta of the keel 20 in 0,01 mm.

Agrees not with any one of Smiths species; as I have not seen any disposition of the genus, I do not know if the species, found by me, is already described.

Rare. Vestervik.

Fam. **Surirelleæ.**

Surirella Turp.

S. Capronii Bréb.
Vaxholm (Cl.).
Subfoss.: in the diat. deposit near Christianstad.

S. elegans Ehb.
VH. D. B. Pl. LXXI, fig. 3.
Vaxholm (Cl.).

S. striatula Turp.
Schm. Atl. Pl. 24, fig:s 17—22.

Harbour of Pillau (SCHUM. 1867), Södermanland: Häringe, Södertelje (CL.), Vaxholm (CL.).

S. ovata K.
SCHM. Atl. Pl. 23, fig:s 55, 56.
Utterly common in the Baltic, save in the southern part, where it is more scarce. Passes into the following.

S. ovalis K.
SCHM. Atl. Pl. 24, fig:s 1—4.
As the former, but less frequent. Harbour of Travemünde (Ostsee Exp. 1871), Gotland, Vaxholm (CL.), Ångermanland: Näske (CL.), Rathan (CL.), Haparanda (CL.).

S. salina SM.
In the Baltic (SCHUM. 1867).

S. Crumena BRÉB.
SCHM. Atl. Pl. 24, fig:s 7, 8.
In the Baltic (SCHUM. 1867), Vaxholm (CL.).

N. angusta KÜTZ.
VH. D. B. Pl. LXXIII, f. 13.
Helsingfors.

S. Gemma EHB.
Södermanland: Häringe.

Baltic species are also, — according to SCHUM. 1867 —:
S. Brightwelli SM. = S. Crumena BRÉB.
S. didyma K.
S. baltica SCHUM. Both the last are quite unknown to me.

Cymatopleura SM.

C. Solea SM.
SM. Syn. Pl. X, fig. 78.
Not rare on the coast of Upland, Södertelje (CL.), very rare in the Kalmar Sound. Not found more to the south.

C. elliptica BRÉB.
SM. Syn. Pl. X, fig. 80.
Only in almost fresh water: Harbour of Travemünde (Ostsee Exp. 1871), Vaxholm (CL.), the Värtan near Stockholm, Norrtelje.

SCHUMANN mentions' also as occurring in the Baltic:
C. elliptica v. *hibernica* SM.
C. elliptica v *fracta* SCHUM.

Campylodiscus E.

C. Echineis E.

In brackish and in almost fresh water: Harbour of Travemünde (Ostsee Exp. 1871, p. 177), Vaxholm (Cl.), Södertelje (Cl.), Upland: Rådmansö.

Subfoss.: constantly found in the black-clays of eastern Sweden, in the silt and silty clay from Roslagen, in the diat. deposit near Christianstad.

C. Clypeus E.

Occurs as the former. Sölvesborg, Gotland: Slite and Bogevik (Cl.), Södertelje, Upland: Rådmansö.

Subfoss.: as the former, but still more common.

Besides these Schumann mentions as Baltic species:

C. parvulus Sm.

C. Hodgsonii Sm.

C. Stellula Schum.

Fam. **Synedreæ.**

Synedra Ehb.

S. radians K.

VH. D. B. Pl. XXXIX, fig. 11.

Travemünde (Ostsee Exp. 1871, p. 177), Upland: Blidö.

S. Ulna v. *obtusa* Sm.

VH. D. B. Pl. XXXVIII, f. 6.

Harbour of Visby. Length 0,175, breadth 0,0085 mm., striae 12 in 0,01 mm.

v. *splendens* K.

Gotland: Slite (Cl.), Norrtelje, Rathan (Cl.).

S. delicatissima Sm.

VH. D. B. Pl. XXXIX, f. 7.

Gotland: Slite (Cl.), Rathan (Cl.).

S. pulchella K.

This variable species is very common in all parts of the Baltic from the Sound to the northern part of the Gulf of Bothnia and in the Finnish bay.

v. *genuina*.

VH. D. B. Pl. XLI, fig. 1.

Very common.

v. *Smithii* Ralfs.
VH. D. B. Pl. XLI, f. 2.
Still more common than the last species.
v. *Saxonica* (K.) Grun.
S. gracilis Sm.; VH. D. B. Pl. XLI, fig. 3.
Harbour of Travemünde (Ostsee Exp. 1871, p. 177), Gotland: Slite (Cl. Sv. o. N. Diat.), Klintehamn, Östergarn (Cl.), Vaxholm (Cl.).
v. *macrocephala* Grun.
VH. D. B. Pl. XLI, f. 6.
Rathan (Arct. Diat. p. 107).
v. *lanceolata* OM.
VH. D. B. Pl. XLI, fig. 7.
Karlshamn, Gotland: Klintehamn.

S. affinis Kütz.

Forms belonging to this section are utterly common in the Baltic. They vary very much. The striae are generally about 14—18 in 0,01 mm., very seldom less than 12 or more than 18. Thus they generally belong to the true S. affinis K. (str 12,5—18) and more seldom to S. parva K. or S. tabulata K. These two last mentioned I cannot retain as distinct species, as they are distinguished only by the varying number of striae. No more can I consider S. fasciculata K. as a separate species, as it should be characterized only by somewhat longer striae, but these vary much in length, as as in density. Generally the more broadly lanceolate forms have longer striae.

Besides the variation in the striae, we have also to notice a such one in the outline of the valves. They are broadly lanceolate, linear-lanceolate, or linear. The valves are gradually tapering into subacute or somewhat capitate ends, or are produced into longer beaks.

Plate V shows some of the most characteristic forms that I have found in the Baltic, and shows distinctly enough that they cannot be divided into separate species. The varr. I have noticed are:

var. *genuina* incl. v. acuminata Grun. Pl. III, fig:s 23, 25, 26, 28, 32.

Valves linear or linear-lanceolate, ends not produced, str. 12—18 in 0,01 mm. Common everywhere in the Baltic.

v. *tabulata* K. Pl. III, fig. 27.

Coarser var. with more distant striae, 8—12 in 0,01 mm. Specimens from Kiel (CL. & MÖLL. Diat. N:o 21) have 13 str. in 0,01 mm.

Not common: Kiel (l. cit.), Sölvesborg, Karlshamn, Kalmar, Gotland: Östergarn (CL.), Åbo, Helsingfors.

v. *fasciculata* K. Pl. III, f. 24.

Striae 12—14, long, leaving only a narrow line in the middle of the valve.

Rare. Karlshamn.

v. *parva* K. Plate III, fig. 30.

Small, slender var., with dense striae, 20 and more in 0,01 mm.

Rare. Ystad, Gotland: Klintehamn, Helsingfors.

v. *rostrata* nov. var. Plate III, fig:s (29), 31.

Slender variety; valve lanceolate, ends produced into long, capitate beaks.

Rare. Dalarö.

S. Gallionii RABH.

In the Baltic (SCHUM. 1867).

S. crystallina AG.

Linear or a little inflated in the middle and at the ends. The furrows that interrupt the striae, are very distinct. Length about 0,150 mm., breadth of the valve 0,011 mm., striae 16 in 0,01 mm.

Malmö, Travemünde, Sölvesborg.

Staurosira EHB.

S. mutabilis SM.

Very common on the coast of Upland and Södermanland, somewhat rare in the southern part of the Baltic: Sölvesborg, Karlshamn, Gotland: Östergarn (CL.).

Rhaphoneis EHB.

R. amphiceros EHB.

In the Baltic (SCHUM. 1867).

Ordo II. **Placochromaticæ.**

Fam. **Fragilarieæ.**

Fragilaria Lgb.

Fr. vitrea K.
Gotland: Slite (Cl.).

Fr. pacifica Grun.
In the Baltic (Schum. 1867).

Diatoma DC.

D. tenue Ag.
Grun. Verh. Wien 1862, p. 361.
In brackish and almost fresh water. Varies as to size and form of the valve, and density of the striation. Of Grunows (l. cit.) varr. I have to mention:

v. *normale* Grun.
K. Bac. Pl. 17, fig. X, 6, 9—14; Grun. Verh. Wien 1862, p. 362.
Harbour of Pillau (Schum. 1867), Gotland: Klintehamn, Dalarö, Helsingfors, Hernösand (Cl.).

v. *mesolepta* (K.) Grun.
K. Bac. Pl. 17, fig. XVI 1—3; Grun. l. cit.
Peene, Travemünde (Grun. l. cit.).

v. *elongatum* Lgb.
Grun. l. cit.; VH. D. B. Pl. L, fig. 14 e, 18—22.
Harbour of Pillau (Schum. 1867), Gotland: Klintehamn, Dalarö, Helsingfors, Hernösand (Cl.).

v. *pachycephala* Grun.
VH. D. B. Pl. L, fig. 15.
Vesterbotten (VH. l. cit.).

D. vulgare Bory.
VH. D. B. Pl. L, fig:s 1—6.
Dalarö, Hernösand (Cl. & Möll. Diat. N:o 237).

v. *lineare* Sm.
VH. D. B. Pl. L, fig:s 7, 8.
Dalarö (tending towards the following var.).

v. *constrictum* Grun.
Rare: Upland, Helsingfors, Ångermanland: Näske (Cl.), Haparanda (Cl.).

Fam. **Tabellarieæ.**

Grammatophora EHB.

G. oceanica EHB.

Varies much in the form of the valves, — linear or inflated at the middle, — G. nodulosa GRUN. The septa are generally straight in sideview but often sharply incurved near their opening. Str. inconspicuous.

Very common south of Åland. Seems not to occur in the Gulf of Bothnia.

Subfoss.: common in the bottom mud, in black-clay, in silt and silty clay from Roslagen and in bathingsilt from Norrtelje, Furusund, Dalarö and Ronneby.

Rhabdonema (K.) SM.

R. arcuatum LGB.

I never found it living in the Baltic, but saw it in prepared slides from Travemünde, Sölvesborg, Karlshamn and Norrtelje.

Subfoss.: as the last spec.

R. minutum K.

In the Baltic on 150 fathoms (CL. Sv. o. N. Diat.), Travemünde, Karlshamn, Sölvesborg.

Subfoss.: as the former.

Striatella AG.

S. delicatula GRUN.

VH. D. B. Pl. LIV, fig. 6.

Very rare: Kalmar.

Fam. **Licmophoreæ.**

Licmophora AG.

L. Jürgensii K.

Arct. Diat. pag. 110, Pl. VII, fig. 125.

Blekinge (CL. Sv. o. N. Diat.), Kalmar, Gotland (CL. Sv. o. N. Diat.).

L. gracilis (K.) GRUN.

VH. D. B. Pl. XLVI, fig. 13.

In the Baltic (SCHUM. 1867).

L. dalmatica (K.) Grun.
VH. D. B. Pl. XLVII, fig. 7.
In the Baltic (Schum. 1867).

L. ovata (Sm.) Grun.
VH. D. B. Pl. XLVII, fig. 12.
Gotland (Cl. Sv. o. N. Diat.).

L. Ehrenbergii (Kütz.) Grun.
VH. D. B. Pl. XLVII, fig. 10, 11.
In the Baltic (Schum. 1867).

L. Lyngbyei Grun.
VH. D. B. Pl. XLVII, fig. 16.
In the Baltic (Schum. 1867).

L. grandis K.
VH. D. B. Pl. XLVII, fig. 2, 3.
In the Baltic (Schum. 1867).

L. paradoxa C. Ag.
VH. D. B. Pl. XLVIII, f. 10, 11.
Helsingfors.

L. tincta (Ag.) Grun.
VH. D. B. Pl. XLVIII, fig. 13, 14.
Gotland: Slite (Cl.).

L. tenuis (K.) Grun.
VH. D. B. Pl. fig.
Blekinge: Thorhamn (Cl. Sv. o. N. Diat.).

Fam. **Chætocereæ.**

Chætoceros Ehb.

C. Wighami Brightw.

Rare. I very seldom found any vegetative frustule: Vestervik, Kalmar. The sporangial form not rare: Malmö, Vestervik, Upland.

Fam. **Biddulphieæ.**

Schumann mentions the following species as occurring in the Baltic:

Zygoceros Balaena Ehb.
Biddulphia turgida E.
Odontilla polymorpha K.
Amphitetras parallela Ehb.

Fam. **Eupodisceæ.**

Actinocyclus Ehb.

A. Ehrenbergii Ralfs.

Size as large as the marine form.

Gotland: Slite (Cl.), Vaxholm (Cl.).

Fam. **Coscinodisceæ.**

Coscinodiscus Ehb.

C. polyacanthos v. *balticus* Grun.

Arct. Diat. p. 112.

Occurring in single specimens throughout the Baltic.

Subfoss.: common in bottomclay. Occurs in blackclay, in silt from Roslagen and in the bathingsilt from Ronneby. Dalarö, Furusund and Norrtelje.

C. subsalsus nov. spec.

Plate III, f. 33.

Disc slightly convex, marked with pearl-like puncta, which are arranged in irregular concentric and radiating lines. The pearls a little less dense in the middle than half way to the margin, become gradually smaller near the margin. Diam. of the disc 0,035—0,045 mm., pearls 12 in 0,01 mm.

Rare: Upland: Lidö, Norrtelje, Karlshamn.

Subfoss.: Diat. deposit at Sunda in Blidö, Upland.

C. Oculus Iridis Ehb.

Subfossil: alluv. clay from Stentorpa, parish of Wassunda, Upland.

According to Schumann the following species are found in the Baltic;

C. radiatus Ehb.

C. subtilis Ehb.

C. excentricus Ehb.

Hyalodiscus Bail.

H. scoticus (K.) Grun.

Arct. Diat. p. 116; Podosira hormoides Sm.

Marine species, very seldom found living in the Baltic: Öresund (Heib. Cousp.), Malmö, Sölvesborg (in mud), Karlshamn (d:o), Travemünde, Svinemünde, Norrtelje in almost fresh water.

Subfoss.: in enormous masses in bathingslick from Ronneby, in silt from the peat mosses in Roslagen.

Diam. 15—30 μ. On all the specimens that I have examined, I never could trace any sculpture, save the irregularly spotted central umbilicus. Crippled form of Hyalod. subtilis BAIL, that characterises the Arctic Ocean(?)

Cyclotella K.

C. Meneghiniana K.

CL. & MÖLL. Diat. N:o 173.

Rather rare in the southern part of the Baltic: Malmö. More common north of the Kalmar Sound. Common on the coast of Upland and in the Finnish bay.

C. operculata K.

SM. Syn. Pl. V, fig. 48.

Freshwater species occurring in slightly brackish water: Gotland: Fårön (CL.), Vaxholm (CL.), Norrtelje.

Stephanodiscus.

S. Astræa (EHB.) GRUN.

Cyclotella Rotula SM. Syn. Pl. V, fig. 50.

In almost fresh water: Travemünde, Södermanland: Häringe, Norrtelje.

S. Bramaputræ EHB.

Unknown to me. In the Baltic (SCHUM. 1862).

Fam. **Melosireæ.**

Melosira AG.

M. Borreri GREV.

SM. Syn. Vol. II, pag. 56, Pl. L, fig. 330.

Only in really brackish water. Rather rare. Öresund, Travemünde, Kalmar, Vestervik, Helsingfors.

Subfossil: Ronneby bathing silt (utterly common).

v. *bothnica* GRUN.

Length of the frustule greater in proportion to the breadth, a little inflexion in the outline of the side of the valve. Intermediate form to the next spec.

With the main spec.: Malmö, Sölvesborg, Helsingfors, Hernösand (Cl.).

M. Jürgensii K.
M. subflexilis K. Sm. Syn. Pl. LI, f. 331.
Very common everywhere in the Baltic.

M. nummuloides Dillw.
Sm. Syn. Vol. II, p. 55, Pl. XLIX, f. 329.
Not so common as the former species. The Sound — Gefle, Åbo — Helsingfors. Rare in the Gulf of Bothnia.

M. punctata Sm.
Sm. Syn. Pl. LIII, f. 339.
Freshwater species found only in almost fresh water: Vaxholm (Cl.), Norrtelje.

M. varians Sm.
Sm. Syn. Pl.
As the former: Norrtelje, Helsingfors.

M. crenulata K.
Sm. Syn. Pl. LIII, fig. 337.
As the former. Denmark, in brackish water (Heib. Consp.).

M. arenaria Moore.
Sm. Syn. Pl. LII, fig. 334.
Freshwater species: Rostock, Södermanland: Häringe, Södertelje.

Subfoss.: Upland: in blackclay from Såby, Alunda.

M. Westii Sm.
Sm. Syn. Pl. LII, fig. 333, Vol. II, p. 59.
I never saw it living in the Baltic, but found it imbedded in mud at Sölvesborg, Karlshamn, Upland: Rådmansö.

Subfoss.: in bathingsilt from Ronneby, in silt from the peatmosses of eastern Upland and in silty clay from the same region.

The subfossil Baltic form measures only 9—11 μ in diam., and thus is smaller in size than the marine form.

M. sulcata Ehb.
Orthosira marina Sm. Syn. Pl. LIII, fig. 338.
Paralia sulcata Cl.

Common on greater depth in Öresund (HEIB. Consp.). I never found it living in the Baltic but found it in mud from Sölvesborg and Kalmar.

Subfoss.: bathingsilt from Ronneby.

Among SCHUMANNS Baltic species there are also:
M. campylosira EHB.
M. lineata AG., which are quite unknown to me.

Addendum.

Schizonema setaceum K.
v. *polyclados* GRUN.
GRUN. in Botan. Centr.-Blatt $^{47}/_{48}$ 1880.
VH. D. B. Pl. XV, f. 5.

Length 0,034 mm., breadth of the valve 0,006 mm. Striae 17 in 0,01 mm. Central nodule scarcely visible.

Very rare. Helsingfors in slightly brackish water.

Explanation of the plates.

Plate I.

Fig. 1 a—c.	Cocconeis Placentula EHB. v. baltica n. var.
» 2 a, b.	Mastogloia lanceolata THW.
» 3.	» Dansei v. elliptica AG.
» 4.	» Braunii GRUN.
» 5.	Amphora lævis GREG.
» 6.	» macilenta GREG.
» 7.	» robusta v. minor n. var.
» 8.	» sulcata BRÉB.
» 9.	» staurophora n. sp.
» 10.	» augusta GREG. f. minuta.
» 11.	Navicula Thurholmensis n. sp.

Plate II.

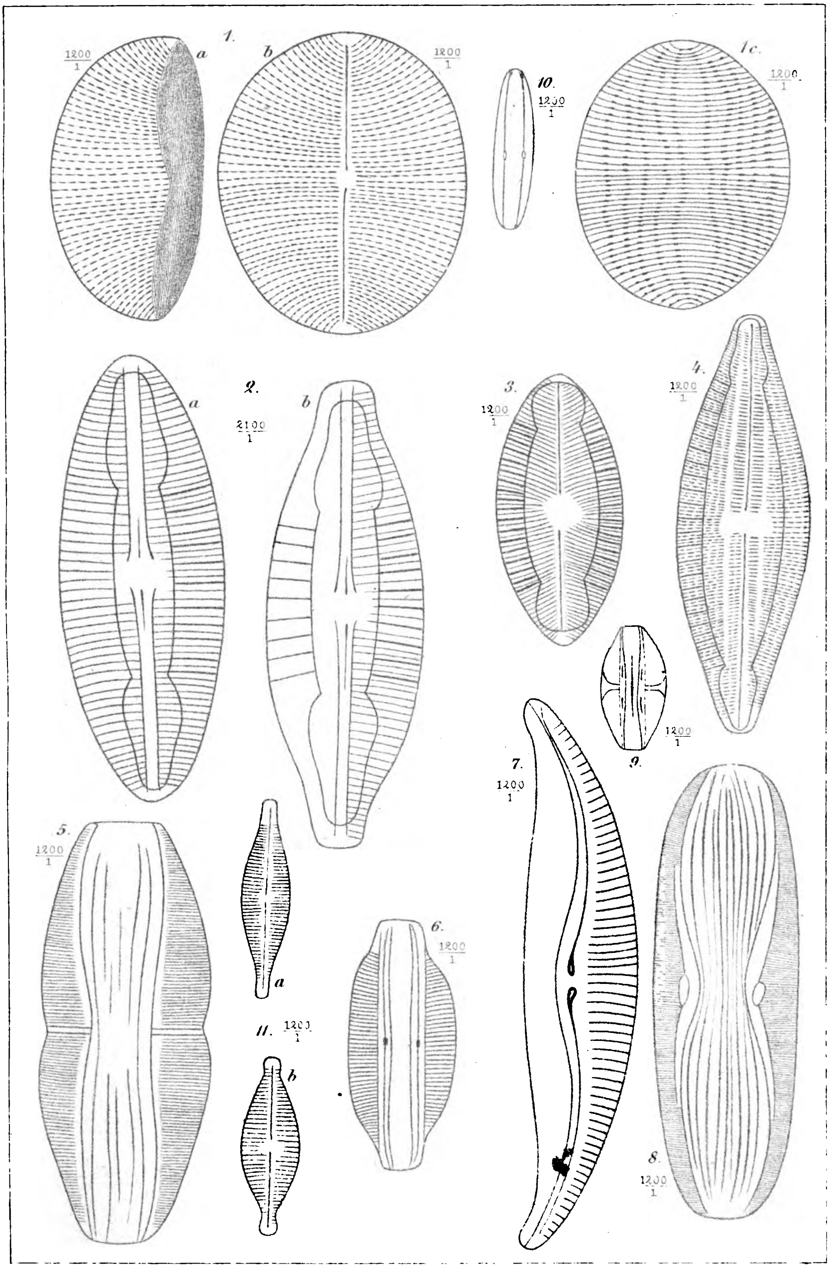
Fig. 12.	Navicula cryptocephala K. var. latior n. var.
» 13.	» divergens SM. f. linearis.
» 14.	» amphisbaena v. subsalina DONK. passing into v. Fenzlii GRUN.
» 15.	» Smithii BRÉB. v. lævis n. var.
» 16.	Schizonema Smithii C. AG.
» 17.	» parvum Menegh.
» 18.	Amphiprora plicata GREG.
» 19.	Berkeleya fennica n. sp.

Plate III.

Fig.	20.	Stauroneis hyalina n. spec.
»	21.	» salina SM. v. latior n. var.
»	22.	Homoeocladia baltica n. sp.
»	23.	Synedra affinis K. v. genuina GRUN.
»	24.	» » v. fasciculata K.
»	25, 26.	» » v. genuina GRUN.
»	27.	» » v. tabulata K.
»	28.	» » v. genuina GRUN.
»	29, 31.	» » v. rostrata n. var.
»	30.	» » v. parva K.
»	32.	» » v. genuina GRUN.
»	33.	Coscinodiscus subsalsus n. sp.

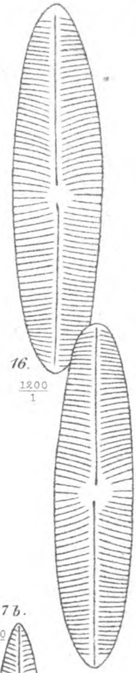
Plate IV.

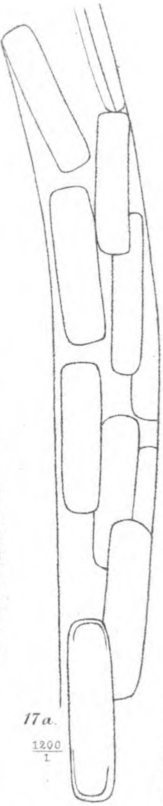
Bottom-specimen-catcher invented by TH. ARWIDSSON.

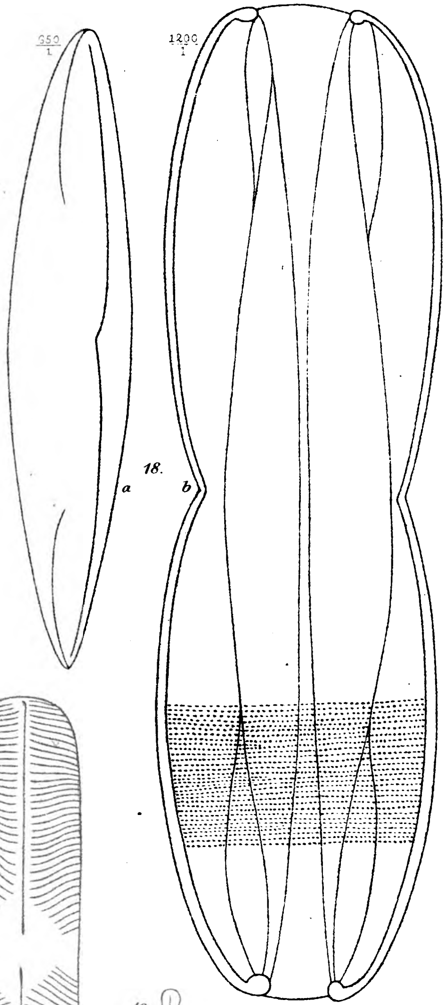


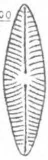
Lith. W. Schlachter, Stockholm.

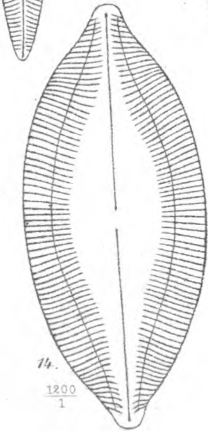
1. Cocconeis Placentula E. v. baltica. 2 a. Mastogloia lanceolata Thw. var. elliptica. 2 b. M. lanceolata Thw. var. amphicephala. 3. M. Dansei Thw. v. [illegible] 4. M. Braunii Grun. 5. Amphora laevis Greg. 6. A. [illegible] Greg. 7. A. robusta var. minor. 8. A. [illegible] Bréb. 9. A. staurophora n. sp. 10. A. angusta Greg. f. minuta. 11. Navicula [illegible] n. sp.

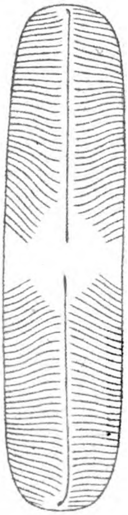


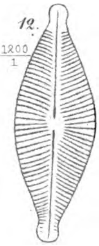


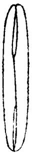


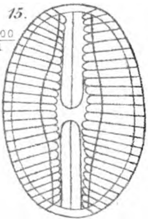






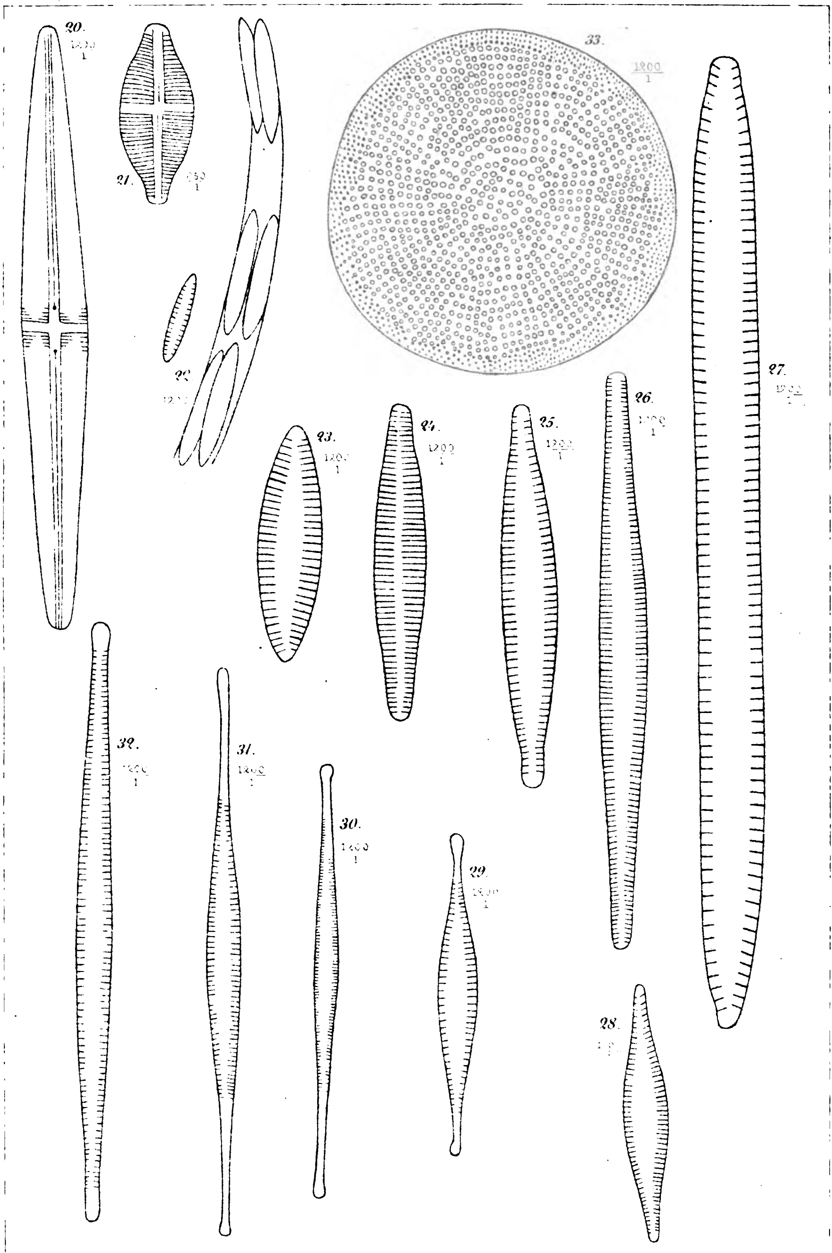






Lith. W. Schlachter Stockholm

12. Navicula [illegible] v. latior. 13. N. divergens v. [illegible] 14. N. amphisbaena Bory v. subsalina Grun. 15. N. Smithii Bréb. v. laevis. 16. Schizonema Smithii C. Ag. 17. Sch. parvum Menegh. 18. Amphiprora [illegible] Greg. 19. Berkeleya fennica n. sp.



Lith. W. [illegible] Stockholm

20. Stauroneis hyalina n. sp. 21. St[illegible] var. latior. 22. H[illegible] gracilis [illegible] n. sp. 23. 25. 27. 28. 30. S. affinis K. v. [illegible]. 24. S. [illegible] K. v. fasciculata. 27. S. affinis K. v. [illegible]. 31. S. affinis K. v. rostrata. 29. S. affinis K. v. parva. 33. Coscinodiscus subtilissimus n. sp.

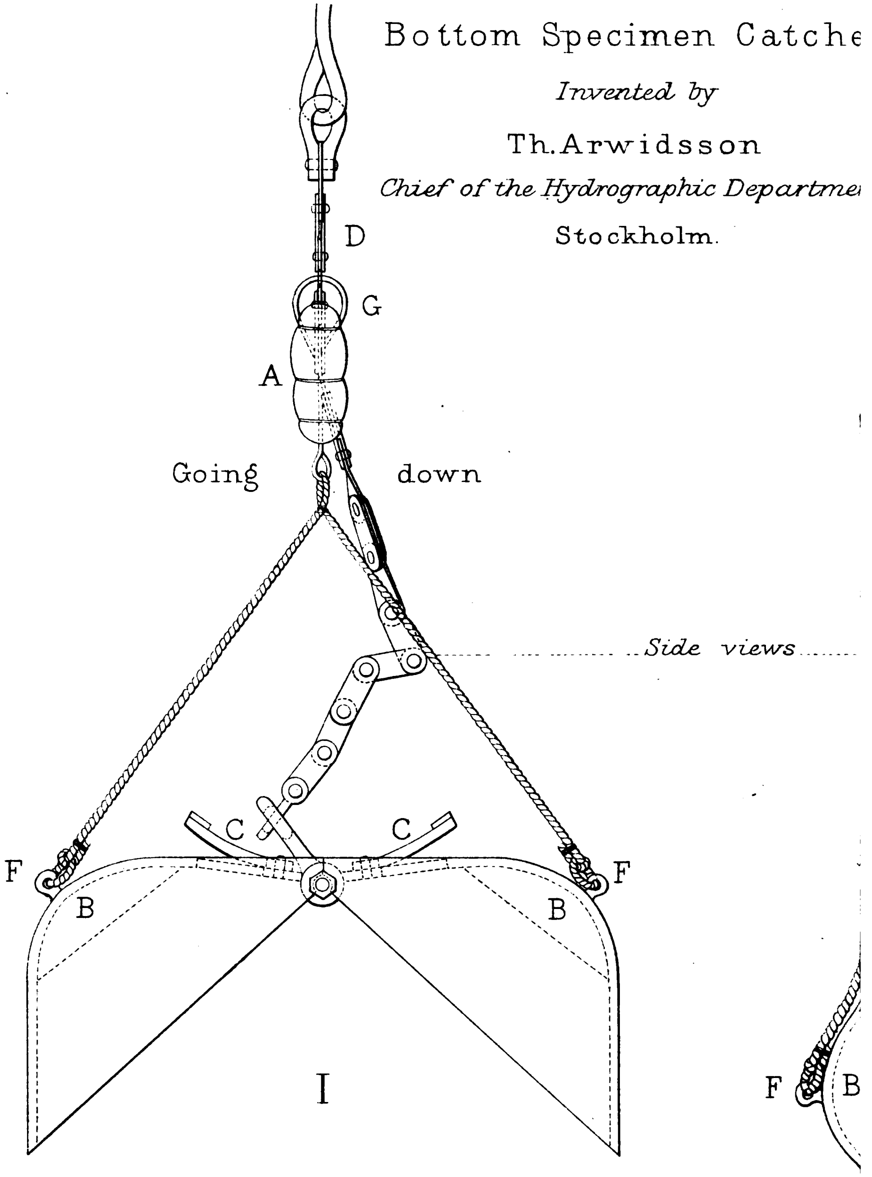
Bottom Specimen Catche

Invented by

Th. Arwidsson

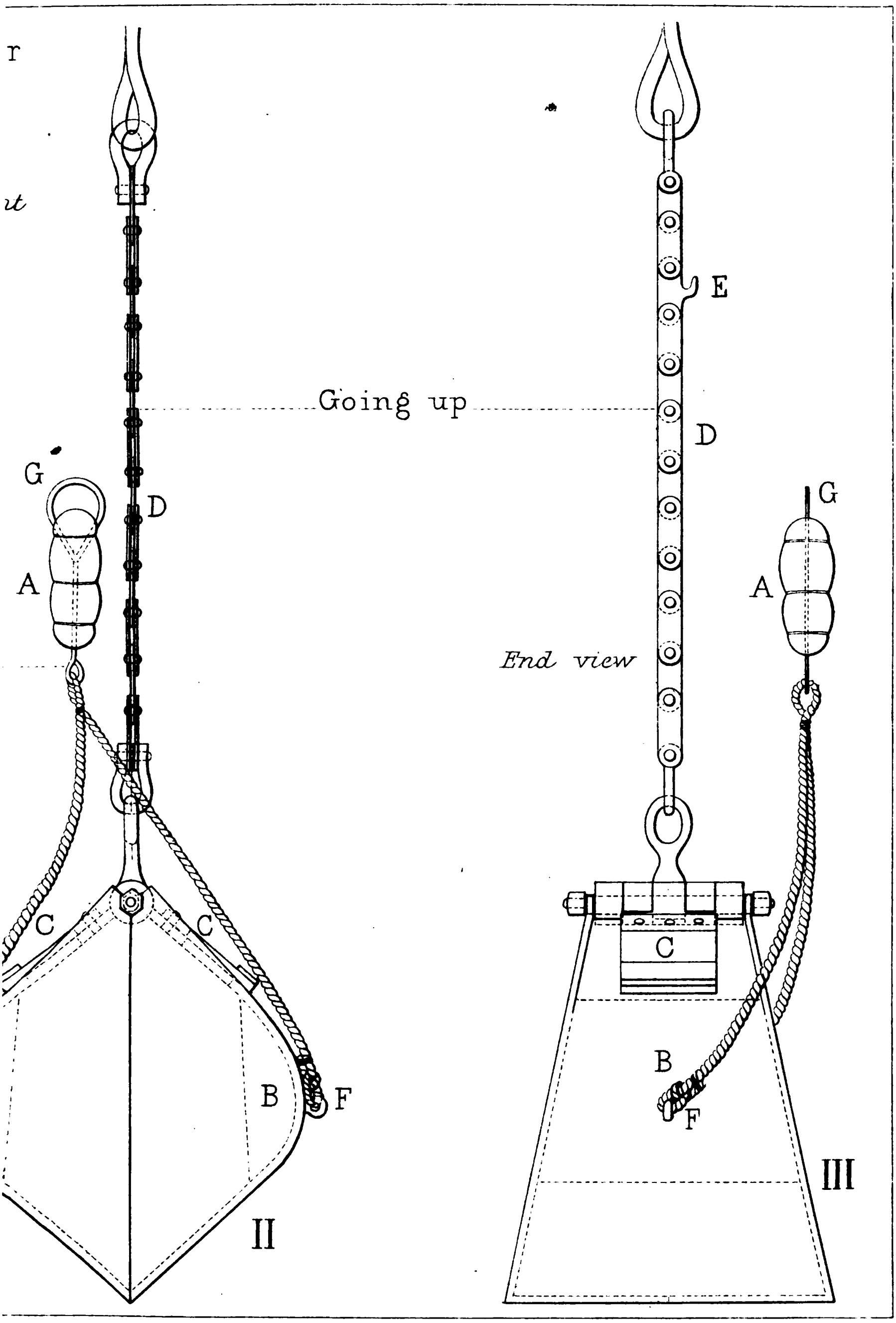
Chief of the Hydrographic Departme

Stockholm.



Scale $\frac{1}{4}$

Plate IV.



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